

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

413,423.7
423.3, 423.7
424.7, 480
522, 449

What is claimed is:

SubAI
5 1. A flame retardant resin coating comprising a flame retardant base resin and a transparent resin top layer, wherein the base resin comprises color pigments and from about 2.5 to about 50% by weight, based on the weight of the base resin, of at least one flame retardant additive selected from the group consisting of melamine polyphosphates, melamine pyrophosphates, ammonium polyphosphates, and mixtures thereof; and wherein the transparent resin comprises from about 0.5 to about 2% by weight, based on the weight of the transparent resin, of at least one sterically hindered amine.

10 2. The flame retardant resin coating of claim 1, wherein the base resin is selected from the group consisting of polyester, polyether, epoxy, polyurethane, acrylic acrylates, melamine acrylates, and silicone (meth)acrylates.

15 3. The flame retardant resin coating of claim 2, wherein the base resin comprises phosphorus-containing polyurethanes obtained by copolymerizing a polymer precursor with monomers, said polymer precursor comprising:

a) a polymerizable unsaturated bond;

b) an oxycarbonyl or iminocarbonyl group;

20 c) a free hydroxyl group or a functional group obtainable by reacting a free hydroxyl group with an appropriate electrophile; and

d) a terminal group, containing phosphorus and oxygen, at the end of a carbon chain, and at least one group selected from a phosphorus hydroxyl group and, optionally, a substituted hydrocarbyl group connected via an oxy group to a phosphorus atom, and
25 being substantially free from halogen-containing groups and having a molecular weight (mass number Mn for a polymer) of from about 200 to about 5000 daltons, and, optionally, a viscosity of less than about 14,000 mPa. s.

SubAI
cont

4. The flame retardant resin coating of claim 2, wherein the base resin comprises phosphorus-containing polyurethanes obtained by copolymerizing an organic compound or a polymer with monomers, said organic compound or polymer comprising at least one unsubstituted or substituted cycloalkoxy group in which at least one of the ring atoms is oxygen, the cycloalkoxy group being connected to at least one unsubstituted or α -substituted alkylenylcarbonyloxy group having at least one active hydrogen atom α to the carbonyl group, wherein

a) at least one cycloalkoxy group may optionally react with a phosphate ester to form a terminal phosphate ester group which possesses a hydroxyl group on the β carbon atom; and/or

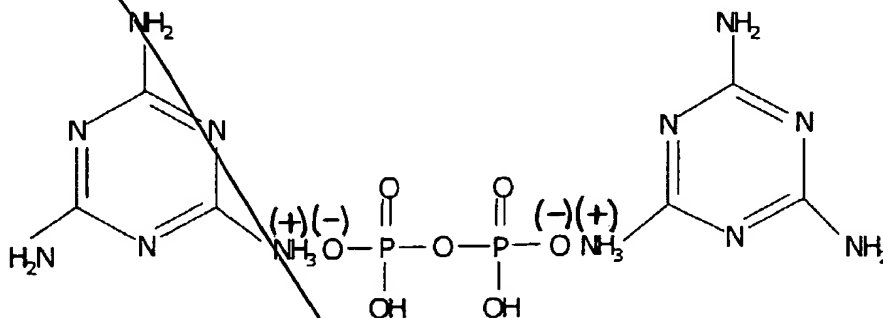
b) at least one alkylene carbonyl group may optionally react with a H-phosphonate ester to form a terminal phosphonate ester group β to a carbonyloxy group, and, optionally, at least one cycloalkoxy group may react with a carboxylic acid group conjugated with an unsaturated group, to form a carbonyloxyhydroxyalkyl group which is adjacent to an unsaturated carbon bond, and, in one or both cases, the resultant product contains at least one phosphorus atom, at least one hydroxyl group and at least one polymerizable unsaturated carbon bond.

5. The flame retardant resin coating of claim 1, wherein the transparent resin contains from about 0.5 to about 5% by weight, based on the weight of the transparent resin, of at least one UV absorber.

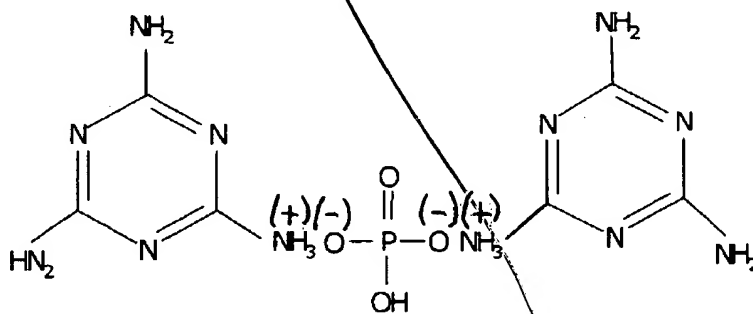
6. The flame retardant resin coating of claim 1, comprising a melamine polyphosphate of formula $(C_3H_8N_6)_n \cdot (HPO_3)_m$, where n and m are natural numbers and the molar ratio of phosphorus to melamine ranges from about 1:0.5 to about 1:3.

7. The flame retardant resin coating of claim 1, comprising a melamine polyphosphate of formula $(C_3H_8N_6)_n \cdot (HPO_3)_m$, where n and m are natural numbers and the molar ratio of phosphorus to melamine ranges from about 1:1 to about 1.5:1.

8. The flame retardant resin coating of claim 1, comprising a dimelamine pyrophosphate of structural formula:

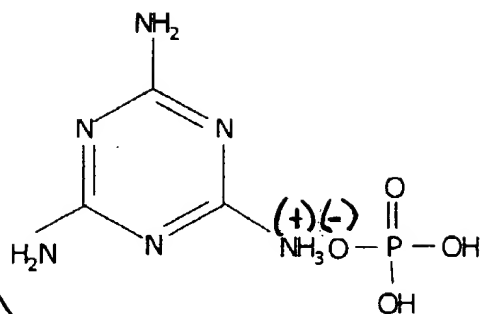


9. The flame retardant resin coating of claim 1, comprising a dimelamine orthophosphate of structural formula:



10. The flame retardant resin coating of claim 1, comprising a monomelamine orthophosphate of structural formula:

Sub A1
cont



11. The flame retardant resin coating of claim 1, wherein the particles of ammonium polyphosphate are microencapsulated in a resin whose water solubility ranges from about 0.06 to about 0.19 g/100 g water at a temperature of about 20°C.

12. The flame retardant resin coating of claim 1, wherein the flame retardant additives have a phosphorus content of from about 2.5 to about 50% by weight, based on the weight of the respective additive.

13. The flame retardant resin coating of claim 1, wherein the UV absorbers comprise triazine, benzylidene-malonate, hydroxyphenylbenzotriazoles, 2-hydroxybenzophenones or oxalanilide.

14. The flame retardant resin coating of claim 13, wherein the UV absorber comprising hydroxyphenyl-s-triazine is present in the transparent resin at from about 0.5 to about 5% by weight, based on the weight of the transparent resin.

15. The flame retardant resin coating of claim 14, wherein hydroxyphenyl-s-triazine is present at 1 to 4 % by weight in the transparent resin.

16. The flame retardant resin coating of claim 2, wherein the

Sub A
cont

polyurethane (meth)acrylate is prepared by reacting a polyurethane with a compound containing at least one phosphorus-containing group, at least one (meth)acrylate group, and at least one functional group which reacts with at least one end group of the polyurethane to form a covalent bond.

5

17. The flame retardant resin coating of claim 16, wherein the phosphorus-containing group comprises a phosphate or phosphonate group.

18. The flame retardant resin coating of claim 16, wherein the (meth)acrylate group comprises part of a (meth)acryloyloxy group.

19. The flame retardant resin coating of claim 16, wherein the functional group which reacts with an end group of the polyurethane to form a covalent bond comprises a hydroxyl group.

20. The flame retardant resin coating of claim 18, wherein the coating comprises from about 1 to about 3 (meth)acryloyloxy groups.

21. The flame retardant resin coating of claim 1, wherein the base resin comprises at least one flame retardant additive selected from the group consisting of salts of phosphorous acid, a phosphonic acid, a phosphonous acid, a phosphinic acid and/or a phosphinous acid with ammonia and melamine.

22. The flame retardant resin coating of claim 1, wherein the base resin comprises at least one flame retardant additive selected from the group consisting of poly salts and pyro salts of phosphorous acid, a phosphonic acid, and/or a phosphonous acid with ammonia and melamine.

